AMENDMENTS TO THE CLAIMS:

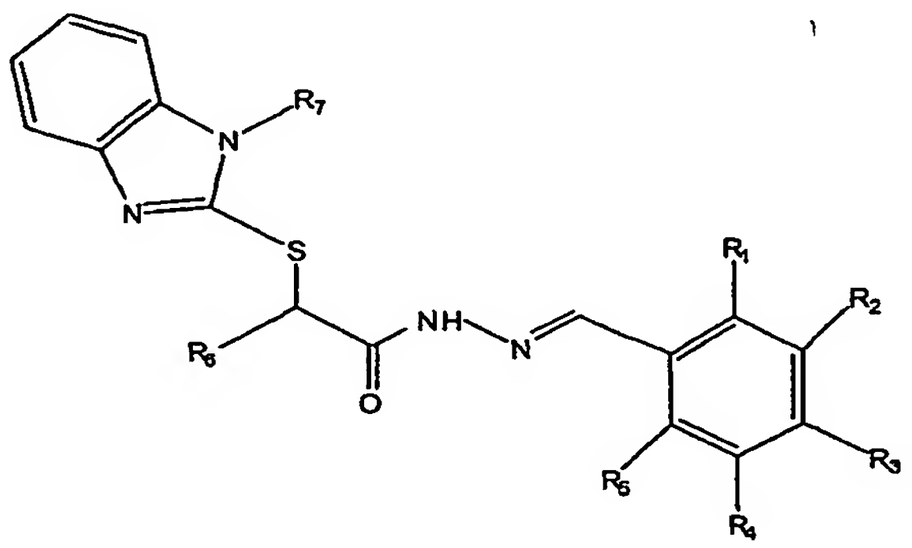
This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1-42. (Cancelled).

43. (New) A method of treating a disorder mediated by a soluble adenylyl cyclase of a subject, said method comprising:

administering to the subject a therapeutically effective amount of a compound that modulates the soluble adenylyl cyclase, said compound having the following formula:



wherein:

R_1 is H, OH, alkyloxy, or halogen;

R_2 and R_5 are H or halogen;

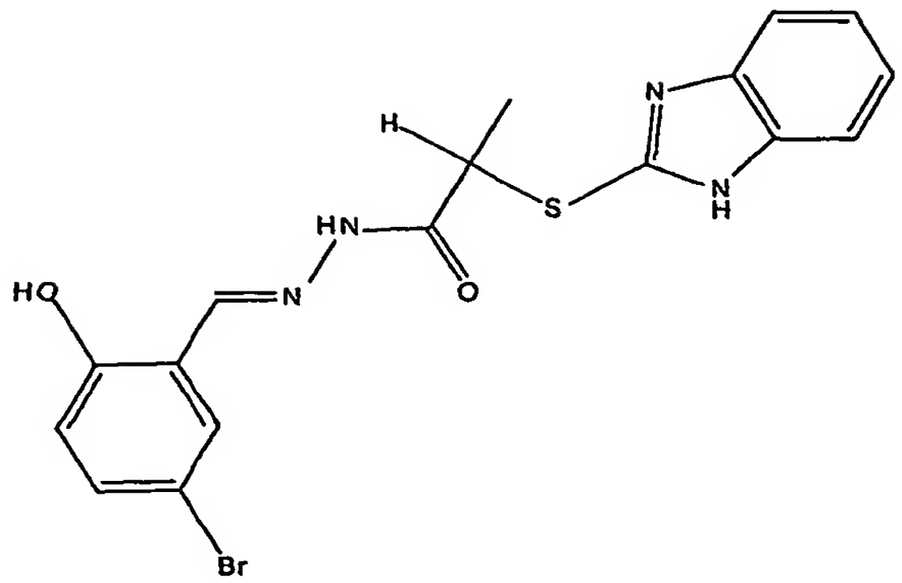
R_3 is H or OH;

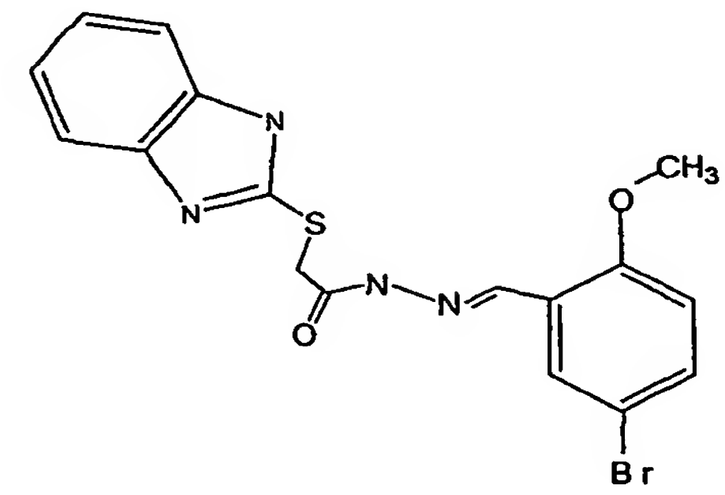
R_4 is H, alkyloxy, or halogen;

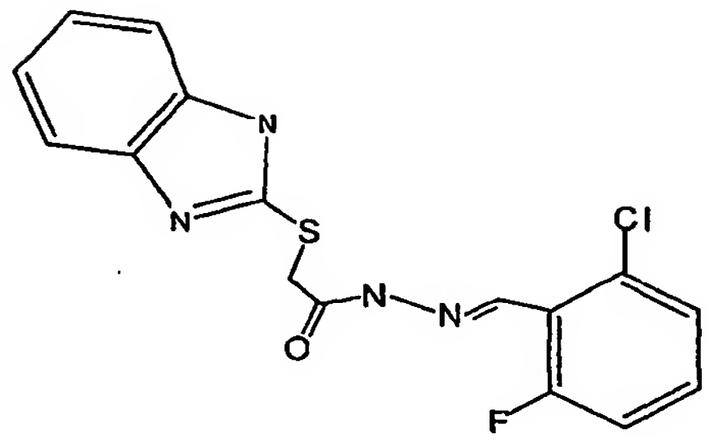
R_6 is H or alkyl; and

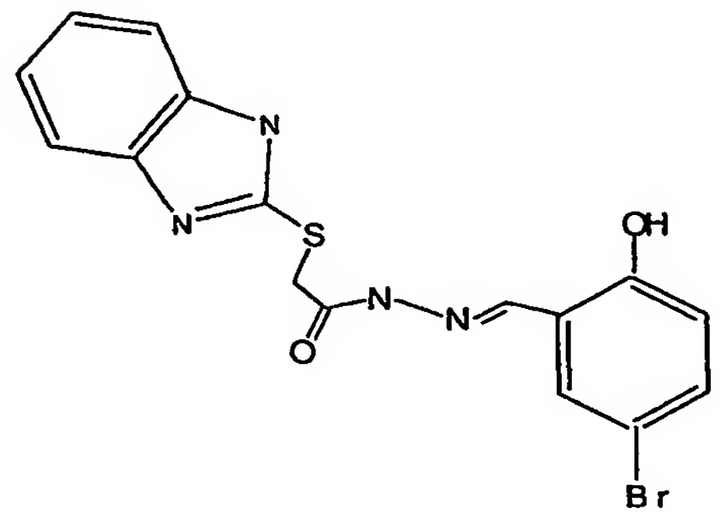
R_7 is H or CH_2R_8, wherein R_8 is H, alkyl, or substituted or unsubstituted phenyl, with the proviso that at least one of R_1, R_2, and R_4 is a halogen.

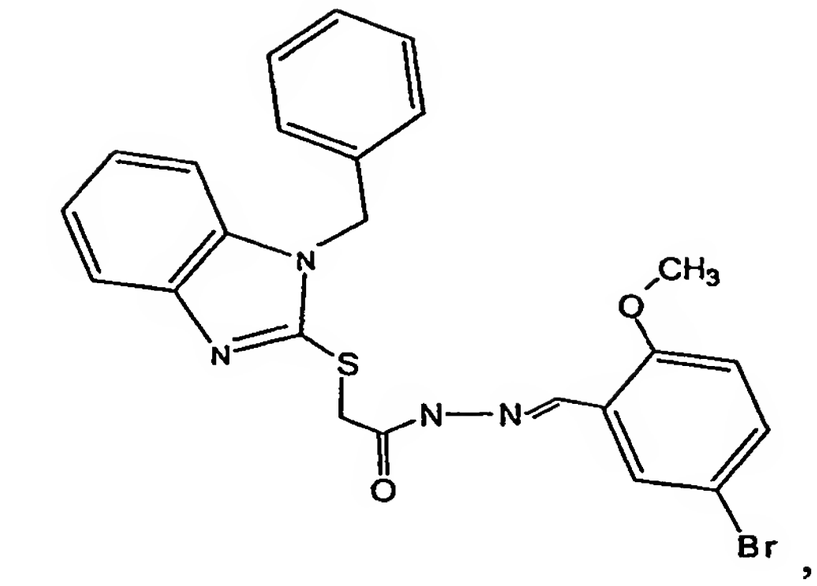
44. (New) The method according to claim 43, wherein the compound is selected from the group consisting of compounds having the following formulas:











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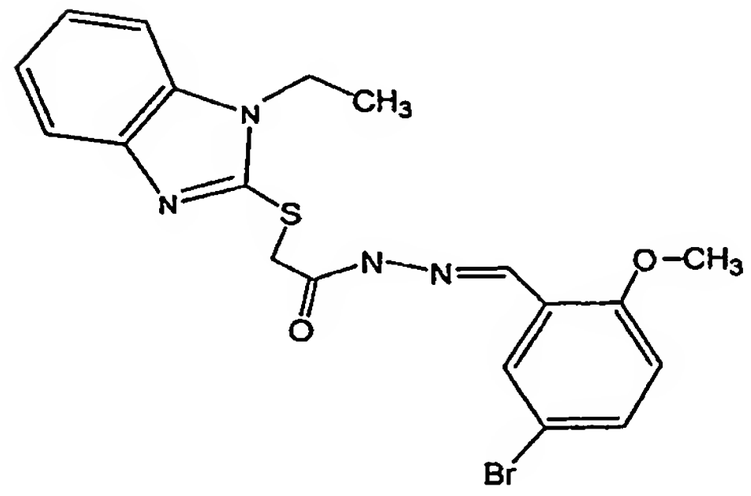

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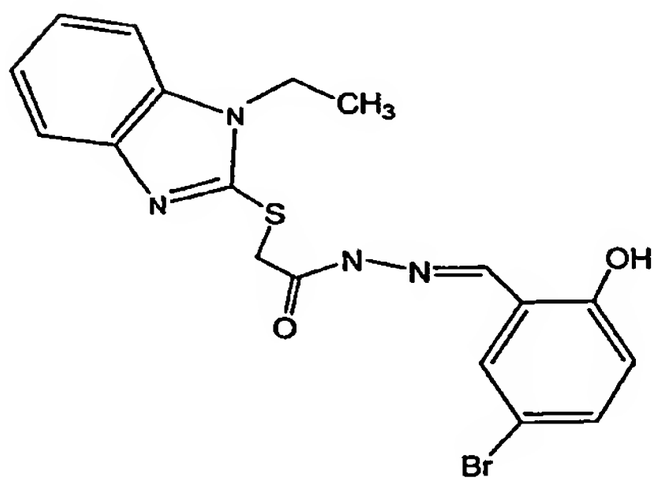

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45. (New) The method according to claim 43, wherein the subject is an eukaryotic organism.

46. (New) The method according to claim 45, wherein the eukaryotic organism is a mammal.

47. (New) The method according to claim 46, wherein the mammal is a human.

48. (New) The method according to claim 47, wherein the disorder is selected from the group consisting of: learning or memory disorders, male fertility/sterility, glaucoma, metabolic acidosis/alkalosis, metabolic disorders, diabetes, breathing disorders, insulin

resistance, hyperinsulinemia, spinal cord injury, Alzheimer's disease, amyotrophic lateral sclerosis, and peripheral neuropathy.

49. (New) The method according to claim 48, wherein the disorder is a learning or memory disorder.

50. (New) The method according to claim 48, wherein the disorder is metabolic acidosis/alkalosis.

51. (New) The method according to claim 48, wherein the disorder is diabetes.

52. (New) The method according to claim 48, wherein the disorder is a metabolic disorder.

53. (New) The method according to claim 48, wherein the disorder is insulin resistance.

54. (New) The method according to claim 48, wherein the disorder is hyperinsulinemia.

55. (New) The method according to claim 48, wherein the disorder is spinal cord injury.

56. (New) The method according to claim 48, wherein the disorder is Alzheimer's disease.

57. (New) The method according to claim 48, wherein the disorder is amyotrophic lateral sclerosis.

58. (New) The method according to claim 48, wherein the disorder is peripheral neuropathy.

59. (New) The method according to claim 43, further comprising identifying the subject suffering from a disorder mediated by a soluble adenylyl cyclase before administering to the subject a therapeutically effective amount of a compound that modulates the soluble adenylyl cyclase.

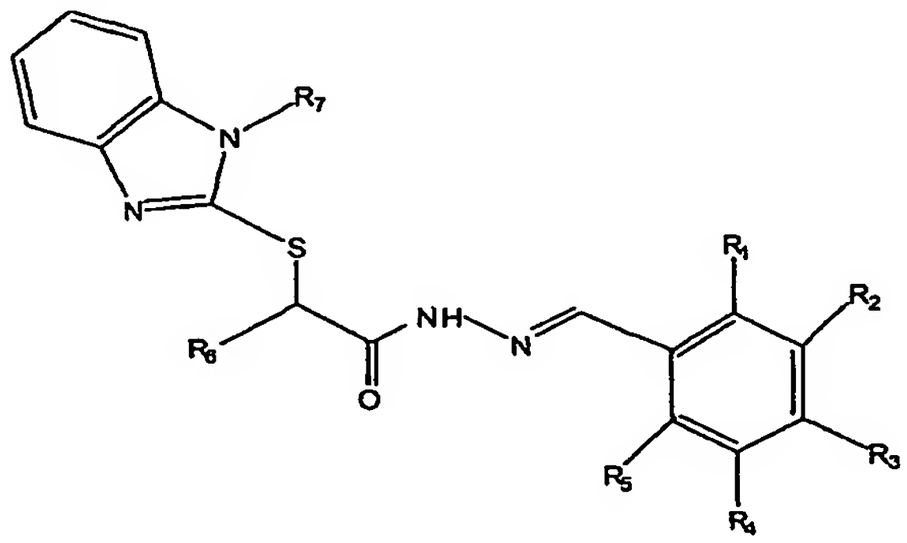
60. (New) A method of treating a disorder mediated by a soluble adenylyl cyclase of a subject, wherein the disorder is selected from the group consisting of: learning or memory disorders, spinal cord injury, Alzheimer's disease, amyotrophic lateral sclerosis, and peripheral neuropathy, said method comprising:
modulating the soluble adenylyl cyclase of the subject.

61. (New) The method according to claim 60, wherein the subject is an eukaryotic organism.

62. (New) The method according to claim 61, wherein the eukaryotic organism is a mammal.

63. (New) The method according to claim 62, wherein the mammal is a human.

64. (New) A pharmaceutical composition for treating a disorder mediated by a soluble adenylyl cyclase of a subject, comprising a therapeutically effective amount of a compound of the following formula:



wherein:

R_1 is H, OH, alkyloxy, or halogen;

R_2 and R_5 are H or halogen;

R_3 is H or OH;

R_4 is H, alkyloxy, or halogen;

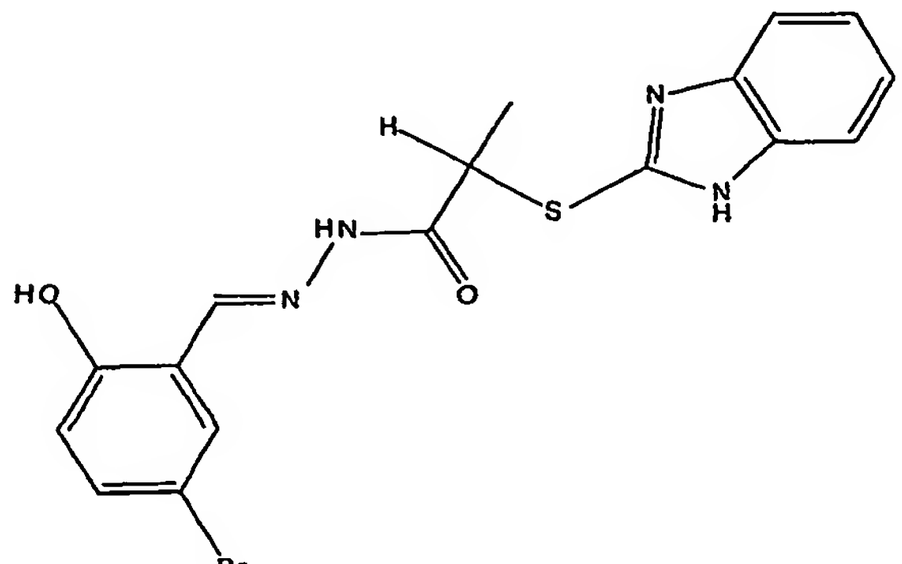
R_6 is H or alkyl; and

R_7 is H or CH_2R_8, wherein R_8 is H, alkyl, or substituted or unsubstituted phenyl,

with the proviso that at least one of R_1, R_2, and R_4 is a halogen,

and one or more pharmaceutically acceptable excipients.

65. (New) The pharmaceutical composition of claim 64, wherein the compound is selected from the group consisting of compounds having the following formulas:



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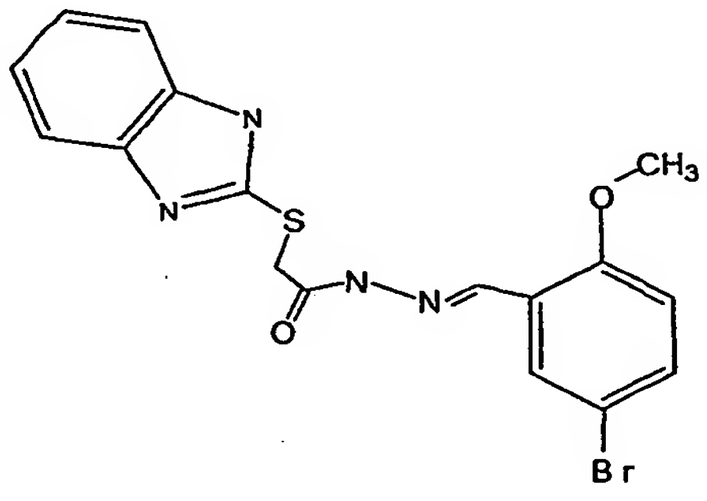

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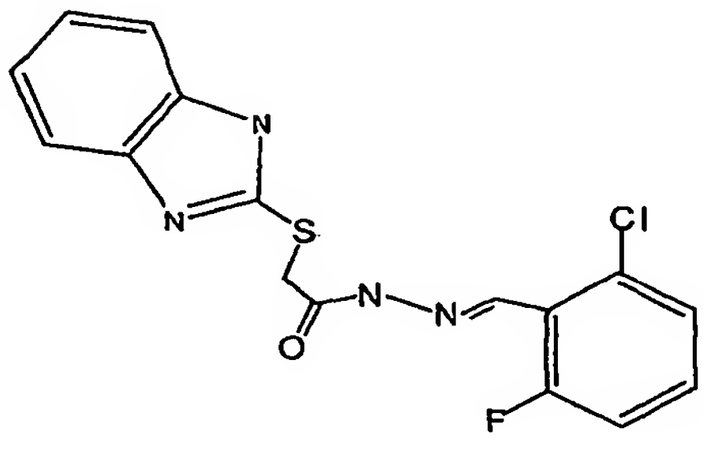

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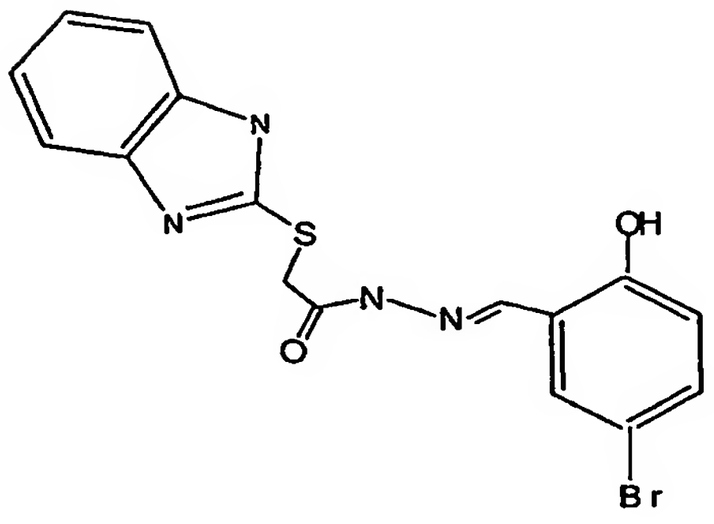

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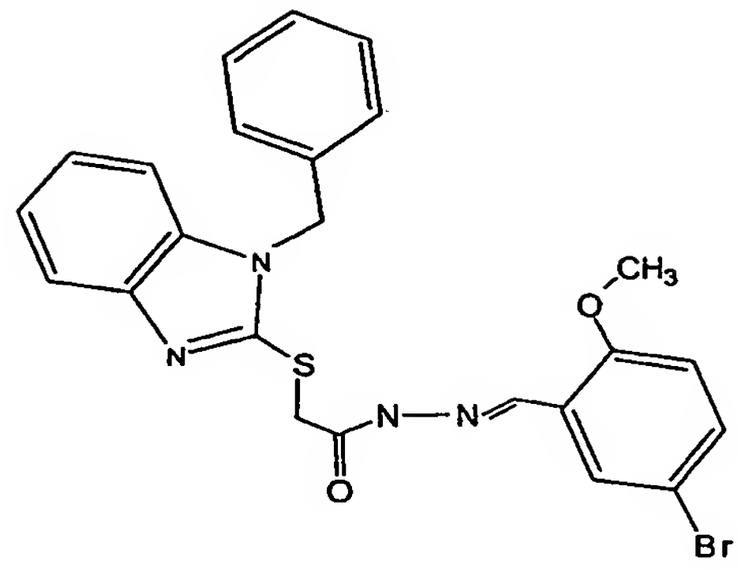

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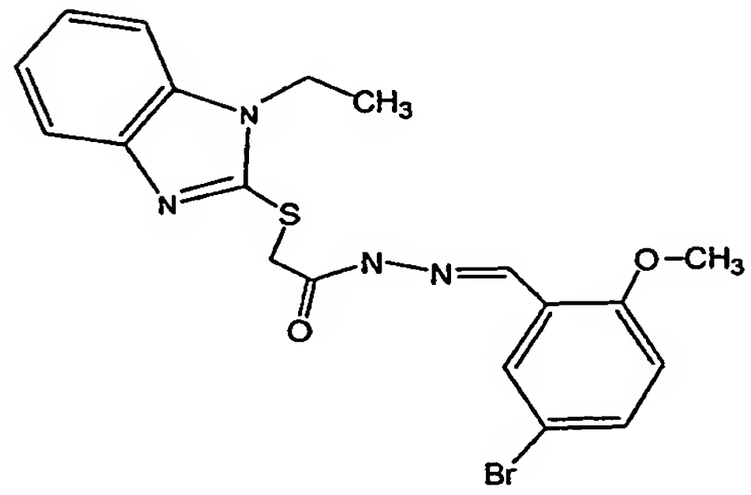
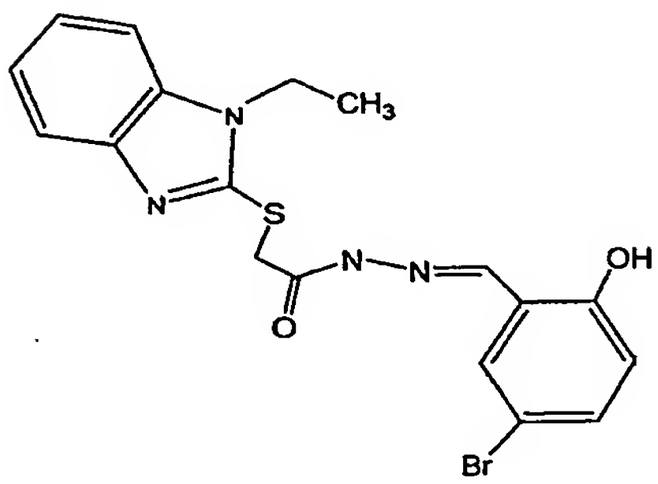


, and



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66. (New) The pharmaceutical composition of claim 64, wherein the subject is an eukaryotic organism.

67. (New) The pharmaceutical composition of claim 66, wherein the eukaryotic organism is a mammal.

68. (New) The pharmaceutical composition of claim 67, wherein the mammal is a human.

69. (New) The pharmaceutical composition of claim 68, wherein the human disorder is selected from the group consisting of: learning or memory disorders, male fertility/sterility, glaucoma, metabolic acidosis/alkalosis, diabetes, metabolic disorders,

breathing disorders, insulin resistance, hyperinsulinemia, spinal cord injury, Alzheimer's disease, amyotrophic lateral sclerosis, and peripheral neuropathy.

70. (New) A method of treating a parasitic infection in a subject, the method comprising: administering to the subject a therapeutically effective amount of a compound that inhibits adenylyl cyclase of the parasite.

71. (New) The method of claim 70, wherein the parasitic infection is malaria.

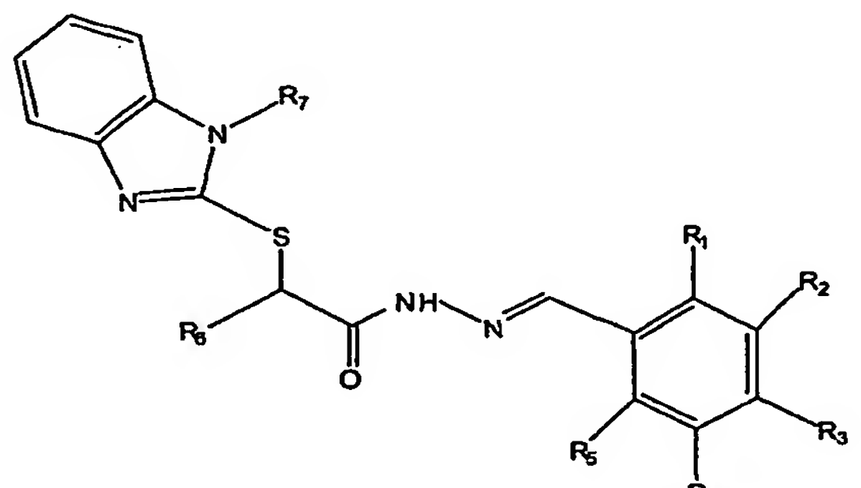
72. (New) The method of claim 70, wherein the compound does not substantially inhibit adenylyl cyclase of the subject.

73. (New) The method of claim 72, wherein the subject is an eukaryotic organism.

74. (New) The method of claim 73, wherein the eukaryotic organism is a mammal.

75. (New) The method of claim 74, wherein the mammal is human.

76. (New) The method of claim 70, wherein the compound has the following formula:



wherein:

R_1 is H, OH, alkyloxy, or halogen;

R_2 and R_5 are H or halogen;

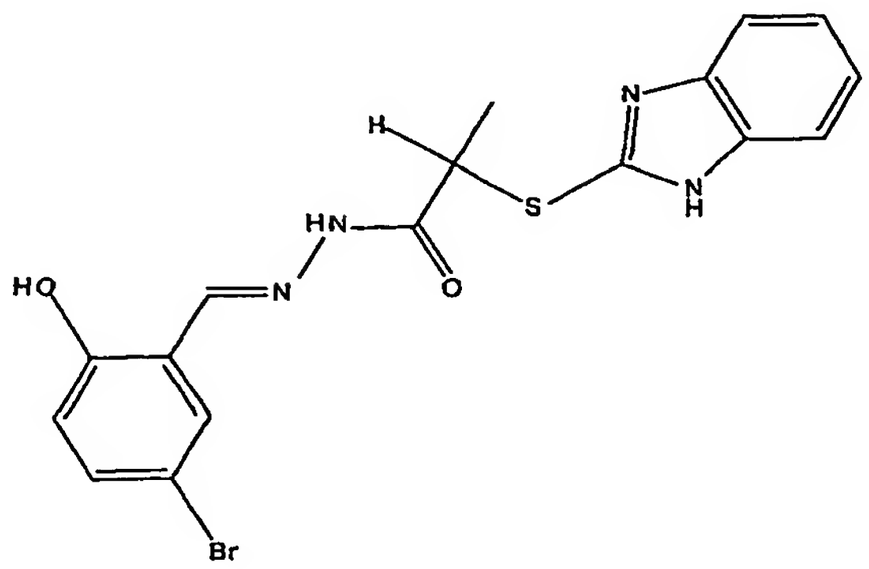
R_3 is H or OH;

R_4 is H, alkyloxy, or halogen;

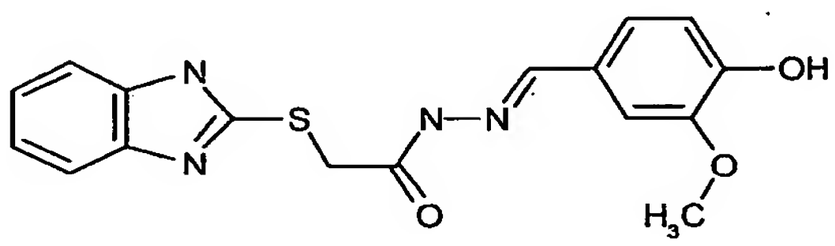
R_6 is H or alkyl; and

R_7 is H or CH_2R_8, wherein R_8 is H, alkyl, or substituted or unsubstituted phenyl, with the proviso that at least one of R_1, R_2, and R_4 is a halogen.

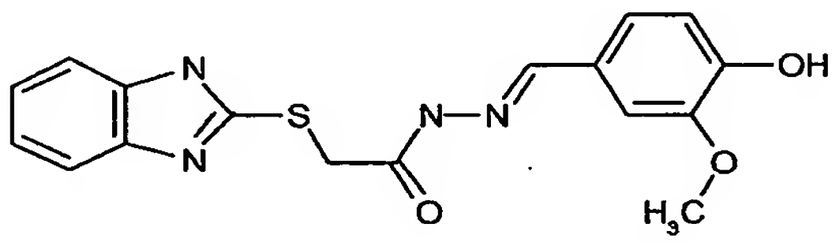
77. (New) The method of claim 76, wherein the compound has the following formula:



78. (New) The method of claim 76, wherein the compound has the following formula:



79. (New) The method of claim 75, wherein the compound has the following formula:



80. (New) The method of claim 76, wherein R_1 is H, R_3 is H, R_4 is H, R_6 is H, and R_7 is H.

81. (New) The method of claim 80, wherein R_2 is halogen and R_5 is H.

82. (New) The method of claim 81 , wherein R_2 is chlorine.

83. (New) The method of claim 80, wherein R_2 is halogen and R_5 is halogen.

84. (New) The method of claim 83, wherein R_2 is bromine and R_5 is fluorine.

85. (New) The method of claim 70, wherein the adenylyl cyclase of the parasite is responsive to bicarbonate.

86. (New) The method of claim 70, wherein the adenylyl cyclase of the parasite is responsive to carbon dioxide.

87. (New) The method of claim 70, further comprising identifying a subject infected or likely to be infected with the parasite before administering to the subject a therapeutically effective amount of a compound that inhibits adenylyl cyclase of the parasite.

88. (New) A method of treating a fungal infection in a subject, the method comprising: administering to the subject a therapeutically effective amount of a compound that inhibits adenylyl cyclase of the fungal organism.

89. (New) The method of claim 88, wherein the fungal organism is C. albicans.

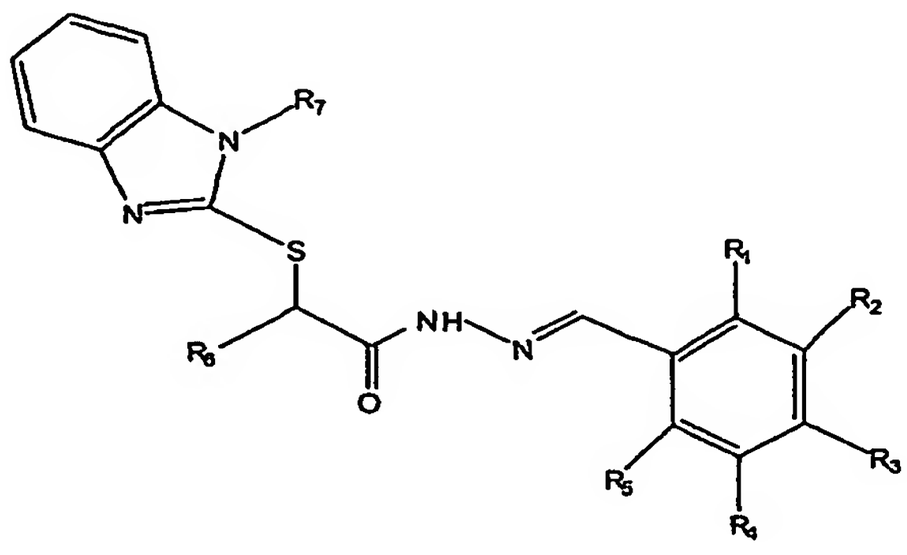
90. (New) The method of claim 88, wherein the compound does not substantially inhibit adenylyl cyclase of the subject.

91. (New) The method of claim 90, wherein the subject is an eukaryotic organism.

92. (New) The method of claim 91, wherein the eukaryotic organism is a mammal.

93. (New) The method of claim 92, wherein the mammal is human.

94. (New) The method of claim 88, wherein the compound has the following formula:



wherein:

R_1 is H, OH, alkyloxy, or halogen;

R_2 and R_5 are H or halogen;

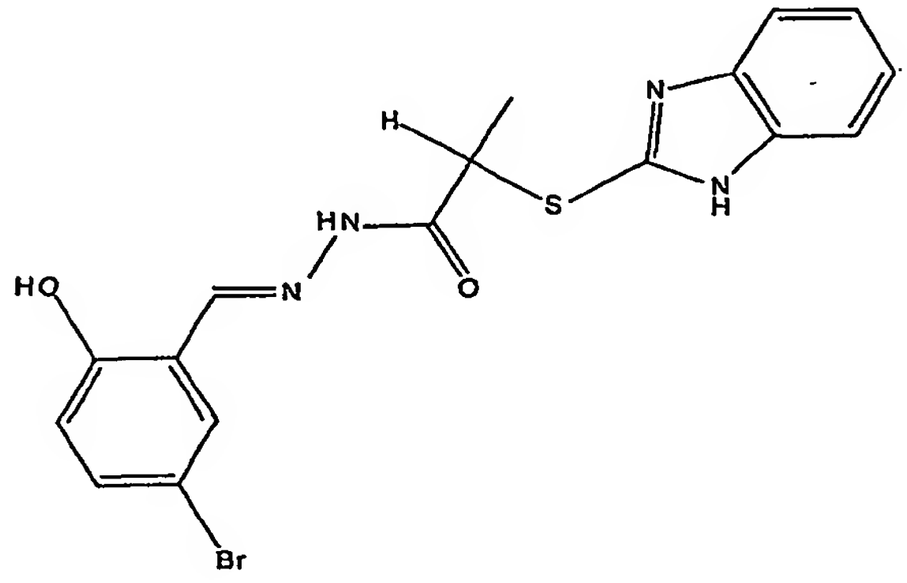
R_3 is H or OH;

R_4 is H, alkyloxy, or halogen;

R_6 is H or alkyl; and

R_7 is H or CH_2R_8, wherein R_8 is H, alkyl, or substituted or unsubstituted phenyl, with the proviso that at least one of R_1, R_2, and R_4 is a halogen.

95. (New) The method of claim 94, wherein the compound has the following formula:



96. (New) The method of claim 88, wherein the adenylyl cyclase of the fungal organism is responsive to bicarbonate.

97. (New) The method of claim 88, wherein the adenylyl cyclase of the fungal organism is responsive to carbon dioxide.

98. (New) The method of claim 70, further comprising identifying a subject infected or likely to be infected with the fungal organism before administering to the subject a therapeutically effective amount of a compound that inhibits adenylyl cyclase of the fungal organism.

99. (New) A pharmaceutical composition for treating a parasitic infection in a subject comprising:

a therapeutically effective amount of a compound that inhibits adenylyl cyclase of the parasite; and

a pharmaceutically acceptable carrier.

100. (New) The pharmaceutical composition of claim 99, wherein the parasitic infection is malaria.

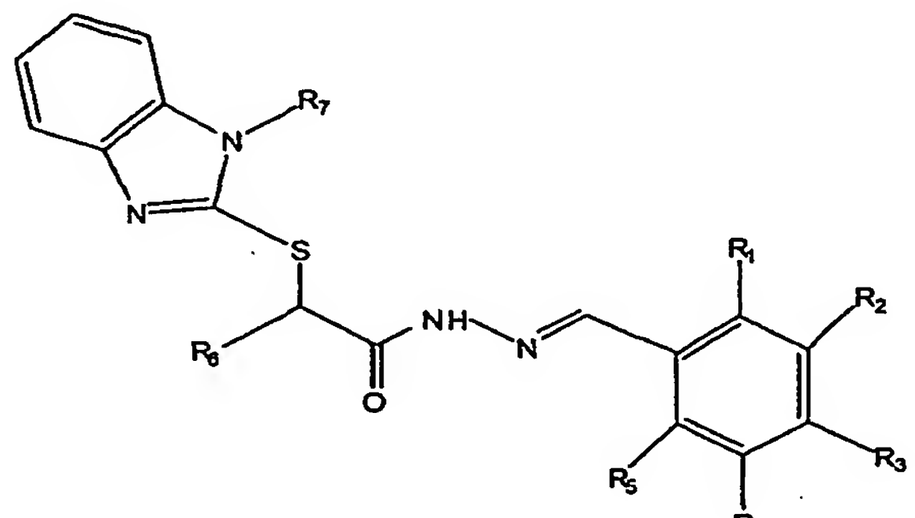
101. (New) The pharmaceutical composition of claim 99, wherein the compound does not substantially inhibit adenylyl cyclase of the subject.

102. (New) The pharmaceutical composition of claim 101, wherein the subject is an eukaryotic organism.

103. (New) The pharamaceutical composition of claim 102, wherein the eukaryotic organism is a mammal.

104. (New) The pharmaceutical composition of claim 103, wherein the mammal is human.

105. (New) The pharmaceutical composition of claim 99, wherein compound has the following formula:



wherein:

R_1 is H, OH, alkyloxy, or halogen;

R_2 and R_5 are H or halogen;

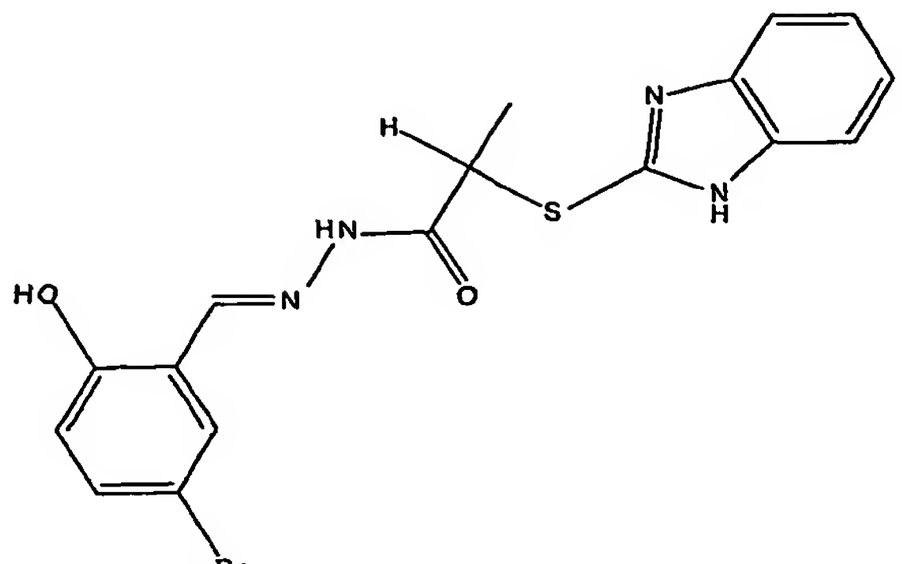
R_3 is H or OH;

R_4 is H, alkyloxy, or halogen;

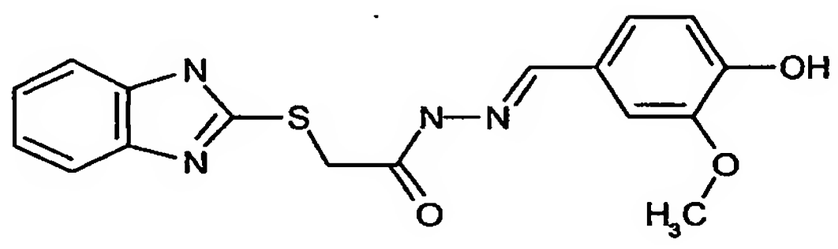
R_6 is H or alkyl; and

R_7 is H or CH_2R_8, wherein R_8 is H, alkyl, or substituted or unsubstituted phenyl, with the proviso that at least one of R_1, R_2, and R_4 is a halogen.

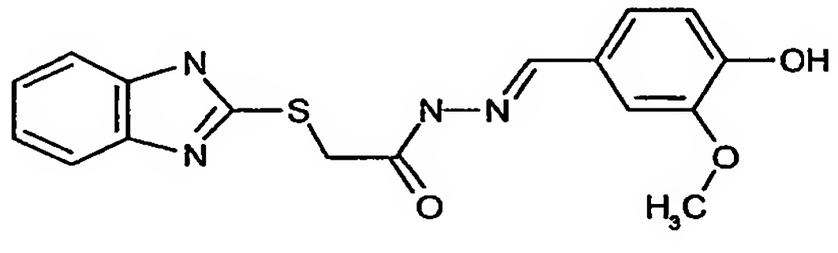
106. (New) The pharmaceutical composition of claim 105, wherein the compound has the following formula:



107. (New) The pharmaceutical composition of claim 105, wherein the compound has the following formula:



108. (New) The pharmaceutical composition of claim 104, wherein the compound has the following formula:



109. (New) The pharmaceutical composition of claim 105, wherein R_1 is H, R_3 is H, R_4 is H, R_6 is H, and R_7 is H.

110. (New) The pharmaceutical composition of claim 109, wherein R_2 is halogen and R_5 is H.

111. (New) The pharmaceutical composition of claim 110, wherein R_2 is chlorine.

112. (New) The pharmaceutical composition of claim 109, wherein R_2 is halogen and R_5 is halogen.

113. (New) The pharmaceutical composition of claim 112, wherein R_2 is bromine and R_5 is fluorine.

114. (New) The pharmaceutical composition of claim 99, wherein the pharmaceutical composition is for oral or parenteral administration.

115. (New) The pharmaceutical composition of claim 99, wherein the adenylyl cyclase of the parasite is responsive to bicarbonate.

116. (New) The pharmaceutical composition of claim 99, wherein the adenylyl cyclase of the parasite is responsive to carbon dioxide.

117. (New) A pharmaceutical composition for treating a fungal infection in a subject comprising, an effective amount of a compound that inhibits adenylyl cyclase of the fungal organism; and

a pharmaceutically acceptable carrier.

118. (New) The pharmaceutical composition of claim 117, wherein the fungal organism is C. albicans.

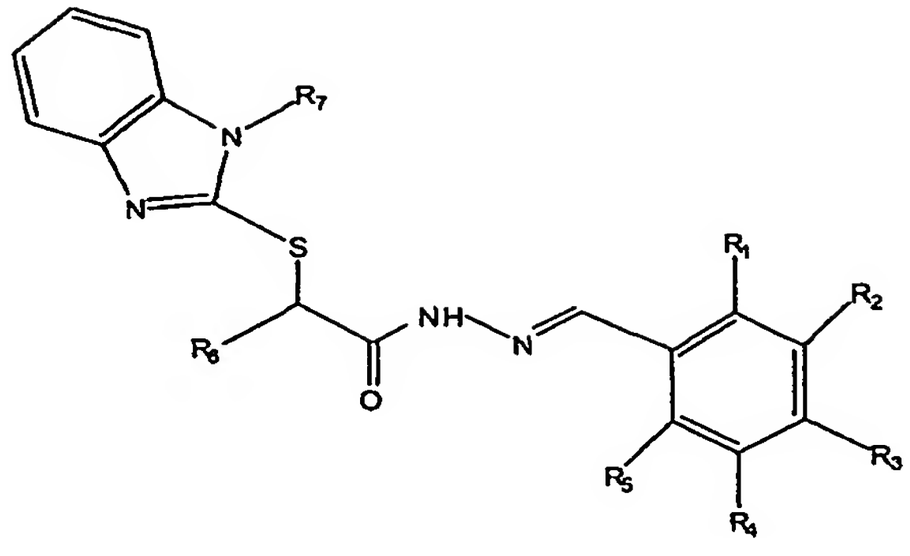
119. (New) The pharmaceutical composition of claim 117, wherein the compound does not substantially inhibit the adenylyl cyclase of the subject.

120. (New) The pharmaceutical composition of claim 119, wherein the subject is an eukaryotic organism.

121. (New) The pharmaceutical composition of claim 120, wherein the eukaryotic organism is a mammal.

122. (New) The pharmaceutical composition of claim 121, wherein the mammal is human.

123. (New) The pharmaceutical composition of claim 117, wherein the compound has the following formula:



wherein:

R_1 is H, OH, alkyloxy, or halogen;

R_2 and R_5 are H or halogen;

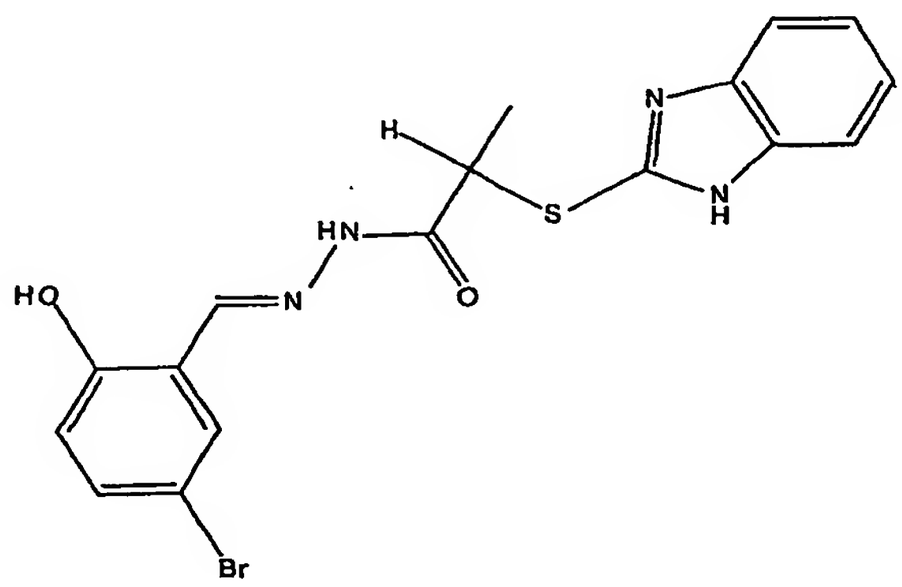
R_3 is H or OH;

R_4 is H, alkyloxy, or halogen;

R_6 is H or alkyl; and

R_7 is H or CH_2R_8, wherein R_8 is H, alkyl, or substituted or unsubstituted phenyl, with the proviso that at least one of R_1, R_2, and R_4 is a halogen.

124. (New) The pharmaceutical composition of claim 122, wherein the compound has the following formula:



125. (New) The pharmaceutical composition of claim 117, wherein the pharmaceutical composition is for oral or parenteral administration.

126. (New) The pharmaceutical composition of claim 117, wherein the adenylyl cyclase of the fungal organism is responsive to bicarbonate.

127. (New) The pharmaceutical composition of claim 117, wherein the adenylyl cyclase of the fungal organism is responsive to carbon dioxide.

128. (New) A method of treating a parasitic infection in a subject mediated by adenylyl cyclase of a parasite in a subject, comprising, inhibiting the adenylyl cyclase of the parasite.

129. (New) The method of claim 128, wherein the parasitic infection is malaria.

130. (New) The method of claim 128, wherein inhibiting adenylyl cyclase of the parasite does not substantially inhibit adenylyl cyclase of the subject.

131. (New) The method of claim 130, wherein the subject is an eukaryotic organism.

132. (New) The method of claim 131, wherein the eukaryotic organism is a mammal.

133. (New) The method of claim 132, wherein the mammal is human.

134. (New) The method of claim 128, wherein the adenylyl cyclase of the parasite is responsive to bicarbonate.

135. (New) The method of claim 128, wherein the adenylyl cyclase of the parasite is responsive to carbon dioxide.

136. (New) A method of treating a fungal infection in a subject mediated by adenylyl cyclase of the fungal organism in a subject, comprising:
inhibiting adenylyl cyclase of the fungal organism.

137. (New) The method of claim 136, wherein the fungal infection is C. albicans.

138. (New) The method of claim 136, wherein inhibiting adenylyl cyclase of the fungal organism does not substantially inhibit adenylyl cyclase of the subject.

139. (New) The method of claim 138, wherein the subject is an eukaryotic organism.

140. (New) The method of claim 139, wherein the eukaryotic organism is a mammal.

141. (New) The method of claim 140, wherein the mammal is human.

142. (New) The method of claim 136, wherein the adenylyl cyclase of the fungal organism is responsive to bicarbonate.

143. (New) The method of claim 136, wherein the adenylyl cyclase of the fungal organism is responsive to carbon dioxide.

144. (New) A method of identifying a compound that is a selective inhibitor of adenylyl cyclase of a parasite, the method comprising:
measuring the inhibitory effect of the compound against one or more human adenylyl cyclases, measuring the inhibitory effect of the compound against adenylyl cyclase of a parasite, and identifying the compound having greater inhibitory effect against adenylyl cyclase of a parasite than against human adenylyl cyclase.

145. (New) The method of claim 144, wherein the parasite is a parasite which infect a human to cause malaria.

146. (New) The method of claim 144, wherein the adenylyl cyclase of the parasite is responsive to bicarbonate.

147. (New) The method of claim 144, wherein the adenylyl cyclase of the parasite is responsive to carbon dioxide.

148. (New) A method of identifying a compound that is a selective inhibitor of adenylyl cyclase of a fungal organism, the method comprising:
measuring the inhibitory effect of the compound against one or more human adenylyl cyclases, measuring the inhibitory effect of the compound against adenylyl cyclase of a fungal organism, and determining whether the compound has a greater inhibitory effect against adenylyl cyclase of a fungal organism than against human adenylyl cyclase.

149. (New) The method of claim 148, wherein the fungal organism is C. albicans.

150. (New) The method of claim 148, wherein the adenylyl cyclase of the fungal organism is responsive to bicarbonate.

151. (New) The method of claim 148, wherein the adenylyl cyclase of the fungal organism is responsive to carbon dioxide.

152. (New) A method of inhibiting adenylyl cyclase of a parasite, the method comprising: contacting eukaryotic cells with a compound that inhibits adenylyl cyclase of the parasite.

153. (New) The method of claim 152, wherein the eukaryotic cell is infected with a parasitic infection.

154. (New) The method of claim 153, wherein the eukaryotic cell is a mammalian cell.

155. (New) The method of claim 154, wherein the mammalian cell is a human cell.

156. (New) A method of inhibiting adenylyl cyclase of a fungal organism, the method comprising: contacting eukaryotic cells with a compound that inhibits adenylyl cyclase of the fungal organism.

157. (New) The method of claim 156, wherein the eukaryotic cell is infected with a fungal infection.

158. (New) The method of claim 157, wherein the eukaryotic cell is a mammalian cell.

159. (New) The method of claim 158, wherein the mammalian cell is a human cell.

160. (New) A method of inhibiting adenylyl cyclase of a parasite, the method comprising: contacting the parasite with a compound that inhibits adenylyl cyclase of the parasite.

161. (New) A method of inhibiting adenylyl cyclase of a fungal organism, the method comprising:

contacting the fungal organism with a compound that inhibits adenylyl cyclase of the fungal organism.